

**Information Services Markets
in the Telecommunications
Industry**

Prepared for:



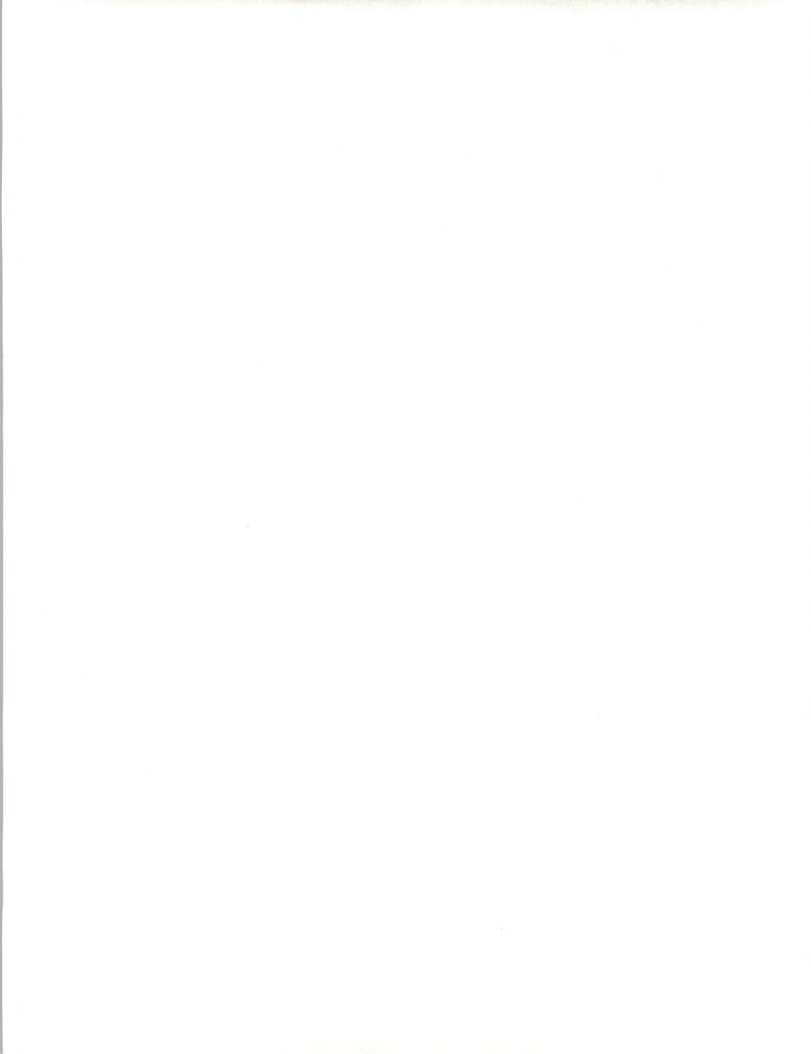
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I. Introduction

INPUT, a well-recognized international information services market research and consulting firm, has conducted a study for GTE Information Services to determine information services market opportunities in the telecommunications industry, 1988 to 1993.

A Objectives

- To provide top-down prioritization of the market opportunities to serve 16 types of telecommunications companies as market sectors with information services provided in 7 high-level delivery modes.
- To recommend high-priority areas for focused analysis.

B Scope

- Quantitative five-year (1988-1993) market analyses and forecasts covering:
 - **The 16 market sectors, as follows:**
 1. Regional Holding Companies (unregulated operations)
 2. Bell Operating Companies (regulated)
 3. AT&T as Interexchange Carrier
 4. Other Large Interexchange Carriers
 5. Small Interexchange Carriers
 6. Large and Small Independent Telephone Companies (excluding GTE)
 7. Value-Added Network Services
 8. Mobile (Cellular, Paging, Air-to-Ground)
 9. Alternative Operator Services Providers
 10. Telex/Telegraph Service Providers
 11. Satellite Operators/Resellers
 12. Cable Vendors
 13. International Carriers
 14. International PTTs
 15. Private Network Owners
 16. Broadcast Networks
 - **The 7 delivery modes identified by GTE Information Services, as follows:**
 1. Processing Services
 2. Professional Services
 3. Packaged Software
 4. Turnkey Systems

5. Systems Integration
6. Network Services
7. Non-Electronic Information Services

(Note: Delivery mode 7 was dropped from the study by mutual agreement)

- Qualitative analysis of needs, trends, top application areas, and key opportunities in the target markets

C

Research Methodology

1. Qualitative Research and Analysis

Used a combination of source material research, telephone interviews with subject experts, and senior-level analysis. Developed a profile of the information services needs of each market sector. Defined the relative applicability of each delivery mode to these needs. Identified key trends. Specified the top application areas.

2. Quantitative Market Forecasts

Based on the needs, trends, and application areas identified, developed quantitative baselines and forecasts for each market sector for 1988 and 1993, including the five-year compound annual growth rate: top-down sizing of market opportunities, based on appropriate combinations of hard data and subjective judgments.

II. Executive Overview

Top information services market opportunities are found in the following market sectors:

- Regional Holding Companies (unregulated operations)
- Mobile (especially cellular telephone)
- Private Network Owners

There is also a very attractive opportunity among Independent Telephone Companies, but reservations kept it just off the "most attractive" list.

For the Regional Holding Companies (RHCs) market sector, the market for outside information services is estimated at \$150 million in 1988, forecast to grow at a 23% Compound Annual Growth Rate (CAGR) through 1993, to \$430 million. This market is primarily in professional services for consulting and application development to support the RHCs' entry into new, unregulated businesses.

For the Mobile market sector (primarily cellular), the 1988 market of \$200 million will grow at a 34% CAGR through 1993, to \$860 million. In 1988 this is concentrated in professional services, with some migration to packaged software by 1993. Billing systems are the hottest application area.

The Private Network market for information services will grow from \$580 million in 1988 to \$1.3 billion in 1993, for a CAGR of 18%. This market is divided fairly evenly among professional services, packaged software, turnkey systems, and system integration modes. Network management is the leading need.

Information services for the non-GTE Independent Telephone Companies will grow 13% from 1988 to 1993, from \$200 million to \$370 million. Processing services and professional services are the top delivery modes.

Among the sectors showing the top market opportunities, no clear pattern emerges as to top application categories. Rather, sector-specific application opportunities predominate, leading to concern about the ability of an information services vendor to leverage applications among two or more market sectors, should that prove critical to profitability.



III. Telecommunications Industry Market Sector Analysis

A

Introductory Notes

This evaluation looks at overall market opportunities, only. It should be noted that it was not a designated subject of this study to determine whether GTE is an appropriate or acceptable supplier.

It is noted by INPUT, however, that a separate issue will have to be considered in many cases: the possible perception of GTE as a potential/actual competitor, and thus an unacceptable vendor of information services.

Please note that numbering (such as "1.a.") throughout this section refers to intersections of rows 1 through 16 with columns a. through g. on the following "Market Sector/Opportunity Matrix," Exhibit III-1.



EXHIBIT III-1

MARKET SECTOR/OPPORTUNITY MATRIX

Market Sectors	Sector Characteristics		Information Services Opportunities				
	a. Size	b. Growth	c. Applications Needs	d. Outsourcing	e. Competition	f. Overall Market Opportunity	g. Comments
1. Rgn. Hld. Cos. (unreg.)	At	At	Mod	Mod	Mod	At	Fragmented
2. Bell Oper. Cos. (reg.)	At	Un	Mod	Mod	Un	Un	Static
3. AT&T as IXC	At	Mod	Mod	Mod	Mod	Mod	Crack the nut
4. Other Large IXCs	Mod	At	Mod	At	Mod	Mod	Will stay in transmission
5. Small IXCs	Un	Mod	Un	At	Mod	Un	Static
6. Inde. Telcos. (not GTE)	Mod	Mod	Mod	Mod	Mod	Mod	GTE's business!
7. Value-Add. Net. Svcs.	Un	At	At	Un	?	Un	Too small
8. Mobile (Cell./Pag./Air.)	Mod	At	At	At	Mod?	At	The new telcos!
9. Altern. Operator Svcs.	Un	Mod	At	At	Mod	Mod	Need help?
10. Telex	Un	Un	Un	Un	Un	Un	Brain dead
11. Satellite Ops./Svcs.	Un	Mod	Mod	Mod	Mod?	Mod	Gamble
12. Cable	Mod	Mod	Mod	Mod?	Mod	Mod	Will telcos compete?
13. International (IRCs)	-	-	-	-	-	Un	Buried
14. PTTs	At	Mod	At	At	Un	Mod	Competition!
15. Private Net. Owners	At	At	At	At	Mod	At	Potential winner!
16. Broadcast Networks	At	Un	Un	Mod	Un	Un	Bundled systems mkt.

Key: At = Attractive, Mod = Moderately Attractive, Un = Unattractive; ? indicates uncertainty



B**Discussion: Market Sector/Opportunity Matrix****1. Regional Holding Companies (unregulated operations)****1. a. Attractive Sector Size**

- Large sector (rough estimate: \$10 billion)
- Sector's major companies/prospective buyers of information services:
 - The unregulated operations of...
 - BellSouth
 - NYNEX
 - Bell Atlantic
 - Ameritech
 - Pacific Telesis
 - U S West
 - Southwestern Bell
 - There are generally 6 to 8 unregulated enterprises within each RHC, thus there are over 50 divisional prospects in total
- Caution: This fragments the market for selling, as do other factors (see "1.c. Moderate Application Needs," below)

1. b. Attractive Sector Growth

- Some cases of fast growth
 - Especially cellular telephone service
 - Note: Cellular discussed under section 8, "Mobile (Cellular, Paging, Air-to-Ground)," below)
- Lots of stumbling into (and out of) new businesses
 - Example: Ameritech into, out of, ADR
 - Example: PacTel into, out of, network management (SPECTRUM)

1. c. Moderate Application Needs

- Each RHC going its own way, or rather, ways
- Each division/company within each RHC largely independent
- Therefore: Highly fragmented buyers
- Exception: Cellular telephone



- Danger: Applications may not prove leveragable across RHCs, due to wide variety of businesses, approaches, and application needs
- Top application areas:
 - Billing
 - Electronic messaging (text and voice), EDI, data bases
 - Front-end gateways
 - Electronic directories

1. d. Moderate Outsourcing Readiness

- Good news: New and growing businesses
 - Therefore: Time pressure to compete, little time to meet information services needs in-house
- Bad news: When acquiring businesses, a RHC may acquire built-in information services capabilities

1. e. Moderate Competition for Outsourcing

- No dominant information services suppliers throughout RHCs identified

1. f. Overall Market Opportunity: Attractive

- Large and growing sector
- Many needs, but fragmented
- Uncertainly/danger: Hard to leverage fragmented applications for profit?

1. g. Comment: "Fragmented"

- Over 50 separate unregulated businesses within 7 RHCs
- Potentially hundreds of application markets
- Can an information services vendor find, leverage, and profit from common applications?

2. Bell Operating Companies (regulated operations)

2. a. Attractive Sector Size

- Large sector (rough estimate: \$70 billion)
- Sector's major companies/prospective buyers of information services:
 - About 20 BOCs



2. b. Unattractive Sector Growth

- POTS (Plain Old Telephone Services) not growing fast
- Regulations permit little else, yet
 - Some state Public Utility Commissions are allowing limited new applications on a trial basis

2. c. Moderate Application Needs

- Good news: BOCs do outsource significant volumes of information services
- Bad news: These applications are very sector-specific, most going back to days of full regulation
 - Few will be leveragable to other market sectors
 - But ... may be leveragable among BOCs
- Top application areas:
 - Billing
 - Customer service
 - Network engineering
 - Equipment maintenance scheduling
 - Number assignment systems
 - Overload processing and programming
 - Operator scheduling and services

2. d. Moderate Outsourcing Readiness

- Even since "deregulation," these regulated companies still outsource many specialized tasks

2. e. Unattractive (High) Competition for Outsourcing

- Many established information services suppliers to BOCs

2. f. Overall Market Opportunity: Unattractive

- The good opportunities have been held by established vendors for years

2. g. Comment: "Static"

- The "leftover," static telephone business



3. AT&T as IXC (Interexchange Carrier)

3. a. Attractive Sector Size

- Large sector (rough estimate: \$35 billion)
- Sector's major company/prospective buyer of information services:
 - AT&T (as IXC)
 - Several divisions within AT&T could be buyers

3. b. Moderate Sector Growth

- Long-distance competition is limiting growth
- Regulations on AT&T are substantially loosened
- But, AT&T's old business outlook is slowing seizure of new opportunities

3. c. Moderate Application Needs

- Good news: AT&T does outsource significant volumes of information services
- Bad news: These applications are very sector-specific, most going back to days of full regulation
 - Few will be leveragable to other market sectors
- Top application areas:
 - Overload processing
 - Overload programming

3. d. Moderate Outsourcing Readiness

- Even since "deregulation," this "semi-regulated" AT&T division still outsources many specialized tasks

3. e. Moderate Competition for Outsourcing

- A number of established information services suppliers to AT&T

3. f. Overall Market Opportunity: Moderate

- Vendor will have to compete for good opportunities

3. g. Comment: "Crack the nut"

- The AT&T information services "nut" is a large one, if a vendor can crack it



4. Other Large IXCs (Interexchange Carriers)

4. a. Moderate Sector Size

- Mid-sized sector (rough estimate: \$5 billion)
- Sector's major companies/prospective buyers of information services:
 - MCI
 - US Sprint

4. b. Attractive Sector Growth

- Gaining market share on AT&T
 - Up to about 20% to 30%
- INPUT forecast: MCI and US Sprint will stay primarily in transmission services and derive little new revenue by 1993 from deregulated, non-transmission business opportunities
 - Even though they are permitted to do so
 - Attention will stay on descending AT&T pricing "umbrella" and overall AT&T competitive strength
 - Long-distance service is still the "big game in town"

4. c. Moderate Application Needs

- Good news: Some signs of moves into more non-traditional services, such as MCI's recent commitment to Alternate Operator Services
- Good news: MCI and Sprint do outsource some information services
- Bad news: Most of these applications are very sector-specific
 - First, to the IXC business
 - Second, to MCI and US Sprint corporate/competitive histories
 - Few will be leveragable to other market sectors
- Top application areas:
 - Billing systems for input to RHCs/BOCs that prepare the actual bills

4. d. Attractive Outsourcing Readiness

- Dealing with fast growth and a tough competitive environment, MCI and US Sprint will continue to outsource many specialized tasks

4. e. Moderate Competition for Outsourcing

- No dominant information services suppliers identified



4. f. Overall Market Opportunity: Moderate

- Good news: Fast sector growth and less-established competition make this sector worth competing for
- Bad news: Only two sizable buyers of information services
- Bad news: INPUT forecasts that the other large IXC's will not move too far into new telecommunications services in the next few years; thus, few needs for new information services beyond growth-related ones

4. g. Comment: "Will stay in transmission"

- Primarily, in terms of revenue (INPUT forecast)
- Otherwise, opportunity could be attractive to provide new information services to serve new non-transmission business opportunities

5. Small IXC's (Interexchange Carriers)**5. a. Unattractive Sector Size**

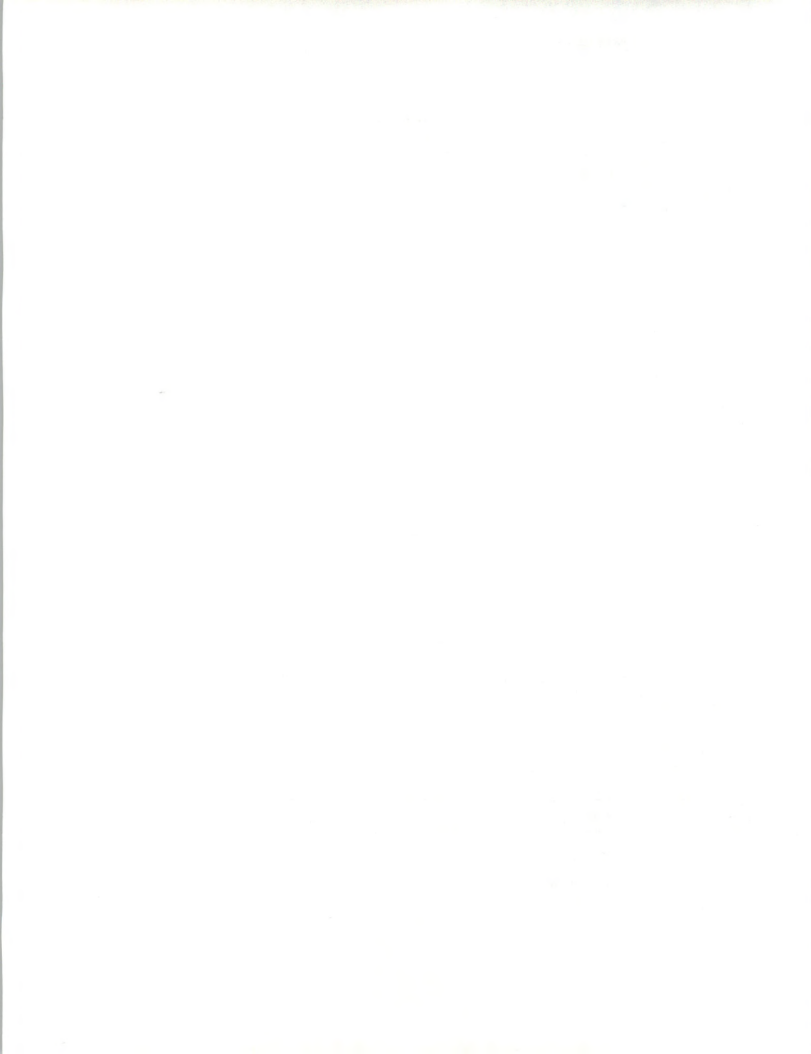
- Small sector (rough estimate: under \$0.5 billion)
- Sector's major companies/prospective buyers of information services:
 - Allnet
 - Litel
 - Many other smaller companies

5. b. Moderate Sector Growth

- Very hard for MCI and US Sprint to compete with AT&T, yet smaller IXC's tend to "fall through the cracks" competitively ... at least so far

5. c. Unattractive Application Needs

- Good news: These small IXC's outsource some information services
- Bad news: These applications are very sector-specific
 - First, to the IXC business
 - Second, to corporate/competitive histories
 - Few will be leveragable to other market sectors
- Top application areas:
 - Billing
 - Example: Litel needs a customized billing system



5. d. Attractive Outsourcing Readiness

- Relatively small companies, no reason to believe they can handle all needs in-house

5. e. Moderate Competition for Outsourcing

- No dominant information services suppliers identified

5. f. Overall Market Opportunity: Unattractive

- Too small a sector for attention
- Unleveragable applications

5. g. Comment: "Static"

- Market sector is going nowhere, given competition

6. Independent Telephone Companies (excluding GTE)**6. a. Moderate Sector Size**

- Mid-sized sector (rough estimate: \$8 billion)
- Sector's major companies/prospective buyers of information services:
 - United Telecommunications
 - Contel
 - Centel
 - Note: Dwarfed by GTE telephone revenues (excluded from this study)

6. b. Moderate Sector Growth

- Still primarily in the regulated POTS business
- Faster growth on the unregulated side
- Uneven, between companies and year to year

6. c. Moderate Application Needs

- Although service opportunities similar to those for the RHCs are now open to them, generally their mindset is still limited to the established businesses
 - Exception: United Telecommunications more aggressive (?), including their buyout of GTE's share of US Sprint and talk of "intelligent networks"
 - Note: US Sprint applications covered in section "4. Other Large IXCs," above
- Good news: Independent telephone companies do outsource significant volumes of information services, as do BOCs



- Bad news: Other application opportunities are specific to the company's willingness to enter other businesses
- Top application areas:
 - Network management
 - Electronic messaging (text and voice)
 - Front-end gateways
 - Electronic directories

6. d. Moderate Outsourcing Readiness

- Even since "deregulation," these "semi-regulated" independent telephone companies still outsource many specialized tasks

6. e. Moderate Competition for Outsourcing

- No dominant information services suppliers identified

6. f. Overall Market Opportunity: Moderate

- Moderate on all scales
- With no roadblocks, actually might prove "Attractive" (see "Comment" below)

6. g. Comment: "GTE's business!"

- One edge to the sword: GTE knows this business
- Other edge: GTE as perceived competitor

7. Value-Added Network Services

7. a. Unattractive Sector Size

- Small sector (rough estimate: \$1 billion)
- Sector's major companies/prospective buyers of information services:
 - Telenet (division of US Sprint, majority owned by United Telecommunications)
 - Tymnet (division of McDonnell Douglas Information Systems)
 - General Electric Information Services Company

7. b. Attractive Sector Growth

- Primary growth in new network-based services like EDI
- Growth of "standard" network services limited by growth of private networks for large corporations, by new fiber optic options, and by T-1 circuit "pipeline" availability



- T-1 network can now be controlled by a high-end personal computer with packaged software
- Potential growth in electronic messaging and in data base ownership/resale/packaging and front-end gateways (beyond mere "traditional" network-based access)

7. c. Attractive Application Needs

- Non-network requirements to grow and enter EDI, electronic messaging, and data base businesses
- Top application areas:
 - Electronic messaging (text only), EDI, data bases
 - Front-end gateways

7. d. Unattractive Outsourcing Readiness

- Historically have been technically strong, unwilling to outsource
- Many have information services parent/sister companies

7. e. Questionable Competition for Outsourcing

- Unknown

7. f. Overall Market Opportunity: Unattractive

- Small sector
- Just six companies to sell to
- Historically limited in outsourcing, for more "pure" networking services
- Unclear commitment to new services

7. g. Comment: "Too small"

- Even with growth projected to 1993

8. Mobile (Cellular, Paging, Air-to-Ground)

8. a. Moderate Sector Size

- Mid-sized sector (rough estimate: \$4 billion)
- Sector's major companies/prospective buyers of information services:
 - McCaw Cellular Communications
 - BellSouth
 - Southwestern Bell



- All RHCs are players, both because of:
 - Market shares they "own" from FCC allocations
 - Non-local market shares they are buying aggressively

8. b. Attractive Sector Growth

- Cellular is growing fast
 - Car-phone market is well-penetrated in major markets
 - Some regions (e.g., L.A.) facing premature channel-capacity problems
 - Good news: Evolution from analog to digital systems will solve capacity problems
 - Bad news: FCC has decided not to set digital standards
 - Bad news: Sector has no experience setting own standards
- Paging is still growing
 - Technology has evolved from simple beepers to alphanumeric displays with multiple-message memory
 - Nationwide paging now available
 - "Wrist pagers" on the horizon
 - Uncertainty: Will "pocket cellular phones" displace growth in pagers in the 5-10 year timeframe?
- Air-to-Ground is still limited in size

8. c. Attractive Application Needs

- Billing applications
 - Standard: Local-connection billing
 - Standard: IXC-connection billing
 - Special: Billing of incoming call connections
 - Special: Billing of connection to local wire carrier
- System-design applications
 - Research and development design and prototyping of several competing new digital cellular network designs
 - Including accommodation of old analog-standard callers within new digital networks (grandfathering)
 - Implementation of many new local digital cellular networks, once standard is set

8. d. Attractive Outsourcing Readiness

- Busy acquiring cellular markets and customers within markets
- Little time for (or expertise in) cellular-network design
- Should be open to new designs for better software control of cellular network
- Little in-house expertise to develop new digital cellular designs
- Will need outside help to quickly build and implement new digital cellular standards



8. e. Moderate Competition for Outsourcing (?)

- No dominant information services suppliers identified
- Uncertainty: Any dominant suppliers for each application?

8. f. Overall Market Opportunity: Attractive

- Fast growing sector, from a moderate base
- Great design and networking applications
- Good billing applications
- Some competitive uncertainties

8. g. Comment: "The new telephone companies!"

- Wire-based POTS business is stagnant
- In contrast, cellular is growing, changing
- Some even forecast cellular displacing some wires
- Remaining uncertainty: Evolution to digital

9. Alternative Operator Services**9. a. Unattractive Sector Size**

- Small sector (rough estimate: \$0.5 billion)
- Sector's major companies/prospective buyers of information services:
 - MCI (as AOS)
 - National Telephone Services Inc.
 - Many minor companies (20 to 100?)

9. b. Moderate Sector Growth

- Due to recent bad press for outrageous charges, new pressure to re-regulate?
- Despite AT&T advertising of an alternative to "alternatives"?
 - Pay phone (or hotel): Dial "1-0-A-T-T-0-AC & number"
 - Gives you AT&T direct-dial long-distance line and rates, not "alternative"
- Key to growth: The Federal Court has mandated allocation of substantial portions of this business away from AT&T
 - Providing a windfall for many small companies
 - Key uncertainty: Can they handle it, or will they fail and/or face new regulatory controls, and thus see their sector deflate within a few years?



9. c. Attractive Application Needs

- Top application areas:
 - Billing
 - System design
 - Network management

9. d. Attractive Outsourcing Readiness

- No reason to believe they are skilled in networking, interconnection, or billing technologies
- Some uncertainty: Needs may be static, already handled

9. e. Moderate Competition for Outsourcing

- No dominant information services suppliers identified

9. f. Overall Market Opportunity: Moderate

- Small, deregulated sector with windfall of allocated business
- Will they need good information services, fast?

9. g. Comment: "Need help?"

- Uncertainty: Even with allocation windfall, have largely static information systems needs already been handled?
- Uncertainty: Will they rise and fall, especially given pattern of abuses?

10. Telex**10. a. Unattractive Sector Size**

- Small sector (rough estimate: \$0.5 billion)
- Sector's major companies/prospective buyers of information services:
 - Western Union
 - MCI (with WUI acquisition)

10. b. Unattractive Sector Growth

- Market shrinking
- Remaining major application: Bank wire transfers
- Death knell: Flexible electronic mail and fax



10. c. Unattractive Application Needs

- Little new in years
 - In "pure" Telex business
 - Exception: Western Union "Easylink" integration of Telex and electronic messaging
 - Similar: Integration of MCI Mail and Telex
- Top application areas:
 - Electronic messaging (text only)?

10. d. Unattractive Outsourcing Readiness

- No indication that integration with electronic messaging is being outsourced

10. e. Unattractive Competition for Outsourcing

- If any applications are being outsourced, someone must have them locked up by now

10. f. Overall Market Opportunity: Unattractive

- No redeeming market features

10. g. Comment: "Brain dead"

- Telex is "an idea whose time has passed"

11. Satellite Operators/Services**11. a. Unattractive Sector Size**

- Small sector (rough estimate: \$0.5 billion)
- Sector's major companies/prospective buyers of information services:
 - Hughes
 - Contel ASC
 - GTE
 - Comsat

11. b. Moderate Sector Growth

- Bad news: New fiber optic capacity has led to a glut of traditional satellite transponder channels
 - Prices have dropped for long-term channel contracts
 - Satellite's share of voice traffic market has peaked
 - Market emphasis shifting to service of broadcasting



- Good news: Emergence of VSAT (small aperture) satellite/antenna systems decreases barriers to local and small-organizational use of satellite channels
 - VSAT terminals forecast to grow from about 10,000 now to over 100,000 by 1993

11. c. Moderate Application Needs

- Especially with introduction of VSAT technology
 - New complexities of many, smaller users
- Top application areas:
 - Billing
 - Network management
 - VSAT - unique applications support

11. d. Moderate Outsourcing Readiness

- VSAT introduction increases system complexity by an order of magnitude
- No reason to believe most operators can handle in-house
- Sector leaders, however, are large corporations and may have other in-house divisions ready to handle new needs

11. e. Moderate Competition for Outsourcing (?)

- No dominant information services suppliers identified
- Uncertainty: Will dominant suppliers emerge quickly for each new application?

11. f. Overall Market Opportunity: Moderate

- VSAT growth and its requirements are the key

11. g. Comment: "Gamble"

- Will VSAT growth fulfill its promise?
- Will sector leaders handle needs in-house?
- Will sector-leader GTE benefit from its experience or be perceived as a competitor?

12. Cable

12. a. Moderate Sector Size

- Mid-sized sector (rough estimate: \$3 billion)



- Sector's major companies/prospective buyers of information services:
 - Tele-Communications
 - United Cable TV
 - Viacom

12. b. Moderate Sector Growth

- Most desirable markets are wired (or "cabled")
- Recent deregulation has already pushed up monthly prices
- Some pressure for re-regulation to limit price increases
- Growth opportunity: "Pay per view"
 - Especially based on new technology
 - Viewer orders movie with telephone call (to a computer)
 - Telephone-connected computer signals cable system to unscramble movie for that viewer and to bill user
 - If abused (example: World Series...), could lead to more regulatory pressure

12. c. Moderate Application Needs

- Many relate to new "pay per view" systems
- Top application areas:
 - Billing
 - System design

12. d. Moderate Outsourcing Readiness (?)

- No reason to believe that their cable experience equips them to deal with the information systems needs of "pay per view," distinctly different from the monthly-service "pipeline" options they have offered historically
- Uncertainty: How complex are the tasks involved?

12. e. Moderate Competition for Outsourcing

- Cable Data Corp. is a major billing services supplier

12. f. Overall Market Opportunity: Moderate

- Moderate all the way, except perhaps unattractive competition



12. g. Comment: "Will telephone companies compete in cable?"

- Potentially, the entire cable ball game could be changed by governmental decisions to permit one or more telephone company sectors (RHCs, BOCs, Independent Telephone Companies) to compete with and/or take over cable locally
 - Especially by bringing very-high-capacity fiber optic lines ("cable for the 1990s and beyond...") into the home for integrated telephone and cable TV/information services
 - GTE is testing this technically (and politically?) in Cerritos, California

13. International (IRCs)**13. a to f. Overall Market Opportunity: Unattractive**

- AT&T handles lots of international traffic (covered in section 3, above)
- MCI has acquired IRCs WUI (Western Union International) and RCA Globecom (covered in section 4, above)
- Western Union has acquired ITT Worldcom, but just for Telex (covered in section 10, above)
- Small players FTCC and TRT are now part of Pacific Telecom
- Bottom line: The IRC market that existed in regulated days is gone today

g. Comment: "Buried"

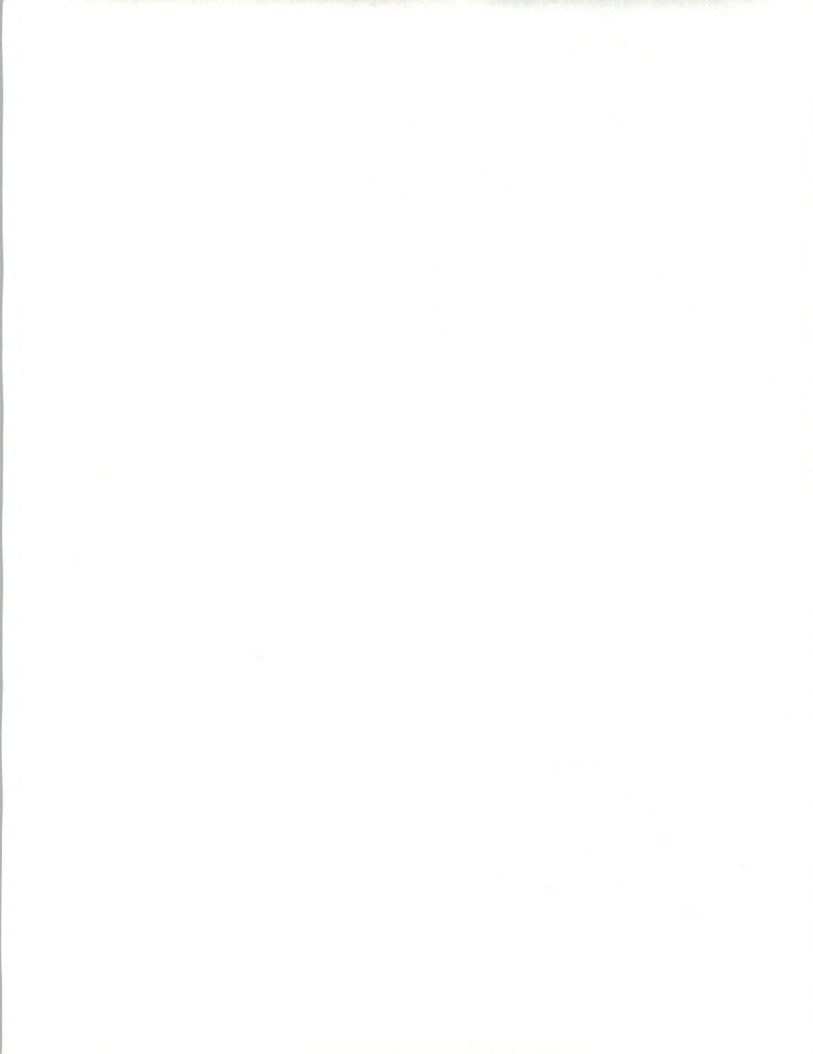
- No need to send flowers

14. PTTs**14. a. Attractive Sector Size**

- Large sector (rough estimate: \$80 billion)
- Sector's major companies/prospective buyers of information services:
 - British Telecom
 - Cable and Wireless
 - France Telecom
 - Deutsch Bundespost-TELEKOM
 - NTT
 - Various PTTs in developing nations

14. b. Moderate Sector Growth

- National regulatory environments favor growth into new services



- Uncertainty in Europe: What shape will post-"1992" competition take?
 - INPUT forecast: Current national PTT "umbrellas" over all telecommunications services will be split, much as in the United States: POTS, IXC, and unregulated businesses; POTS will be national monopolies, and IXC and unregulated businesses will be opened to competition

14. c. Attractive Application Needs

- With encouraging regulatory environments, virtually all telecommunications businesses are open to the PTTs
- Thus, all application needs will likely emerge, including many that overlap the "sector unique" applications found in the U.S. for the RHCs, the BOCs, and the IXCs
- Top application areas:
 - Billing
 - System design
 - Network management
 - Electronic messaging (text and voice), EDI, data bases
 - Front-end gateways
 - Electronic directories
 - "Sector unique" applications

14. d. Attractive Outsourcing Readiness

- They are experienced in substantial outsourcing of information services needs

14. e. Unattractive (High) Competition for Outsourcing

- They have well-established outsourcing suppliers
- Often these are nation-specific suppliers (e.g., Siemens in Germany) that (*de facto* or *de jure*) that essentially "own" the business
- One exception: NTT has contracted with Cincinnati Bell Information Services for a cellular billing system for Japan, and advertises its reliance on American suppliers

14. f. Overall Market Opportunity: Moderate

- Good news: The opportunities are attractive
- Bad news: The competition will be fierce, and often unfair

14. g. Comment: "Competition!"

- Judgment call: Is this insurmountable?



15. Private Network Owners

15. a. Attractive Sector Size

- Large sector (rough estimate: \$10 billion)
- Sector's major companies/prospective buyers of information services:
 - Any corporation/organization with a private network (mainly the Fortune 1000)

15. b. Attractive Sector Growth

- Especially given T-1 "pipelines" available and acceptance of CCITT X.25 networking standard
- Although many large ones have already been built, technical advances will lead to upgrade opportunities

15. c. Attractive Application Needs

- Network purchasers/owners have wide-ranging needs as they "recreate" internally many aspects of the public networking environment they have taken for granted
- Top application areas:
 - System design
 - (Tools for) Network management
 - Electronic messaging, EDI, data bases
 - Front-end gateways

15. d. Attractive Outsourcing Readiness

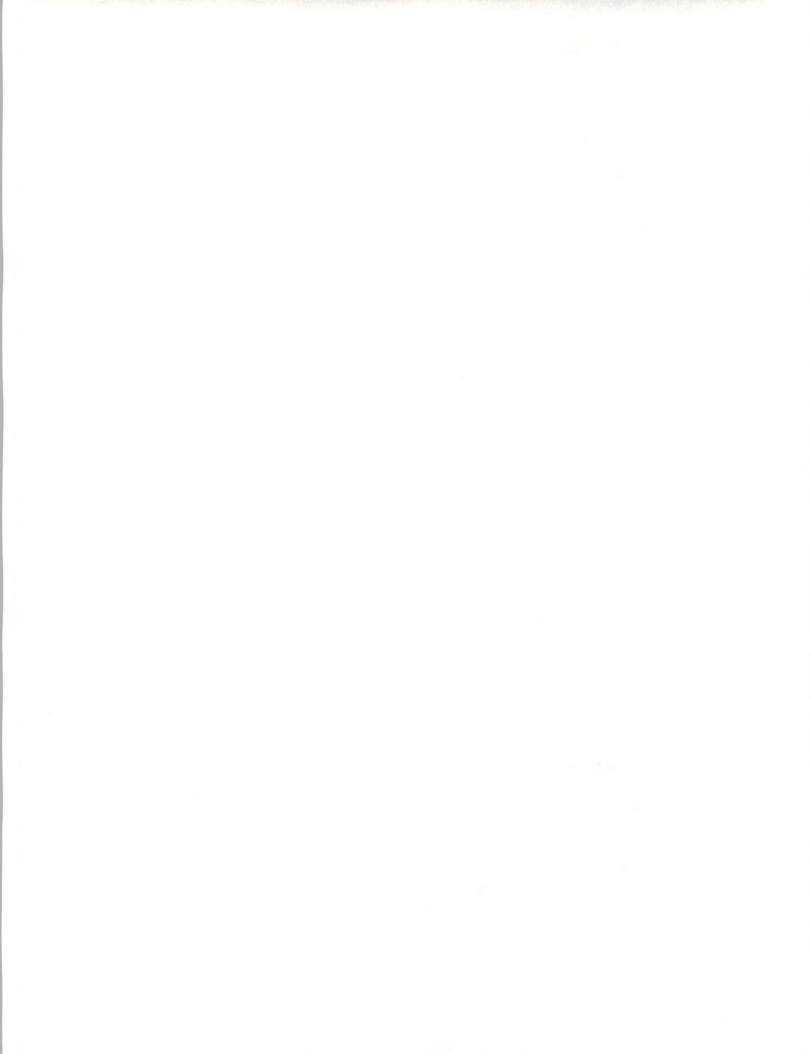
- Network purchasers/owners generally will not be experts in telecommunications; will need outside suppliers to help with design, implementation, and *tools* for network management—although few will outsource the operation of the network itself

15. e. Moderate Competition for Outsourcing

- Fragmented vendor community, with over 50 firms that develop and/or service private network installations
- No dominant information services suppliers identified

15. f. Overall Market Opportunity: Attractive

- Virtually all factors are attractive



15. g. Comment: "Potential winner!"

- An ideal opportunity
- Reservations:
 - Plenty of competition
 - Fast-changing technology

16. Broadcast Networks**16. a. Attractive Sector Size**

- Large sector (rough estimate: \$15 billion)
- Sector's major companies/prospective buyers of information services:
 - ABC
 - CBS
 - NBC
 - CNN and other "challengers" to the traditional networks

16. b. Unattractive Sector Growth

- Cable and video options have stalled network growth

16. c. Unattractive Application Needs

- Broadcasters mainly buy "bundled" systems to meet specific operational needs, not information services more broadly defined
 - Example: Production needs integrated video-tape editing systems that combine computer-controlled hardware and the controlling software
- Top application areas:
 - None (for information services as defined here)

16. d. Moderate Outsourcing Readiness

- The broadcasters do not build most such integrated systems themselves

16. e. Unattractive (High) Competition for Outsourcing

- Broadcasting integrated systems vendors are already well established

16. f. Overall Market Opportunity: Unattractive

- Breaking into this market would be very tough



16. g. Comment: "Bundled systems market"

- As discussed above

17. Non-Electronic Services

By mutual agreement, this market sector was dropped from the project.



IV. Opportunity Evaluation

A

Discussion: Top Applications by Market Sector

Exhibit IV-1, "Top Applications by Market Sector," provides a single point of reference, in matrix form, for the applications discussed in sector-by-sector form in section III. B of this report.

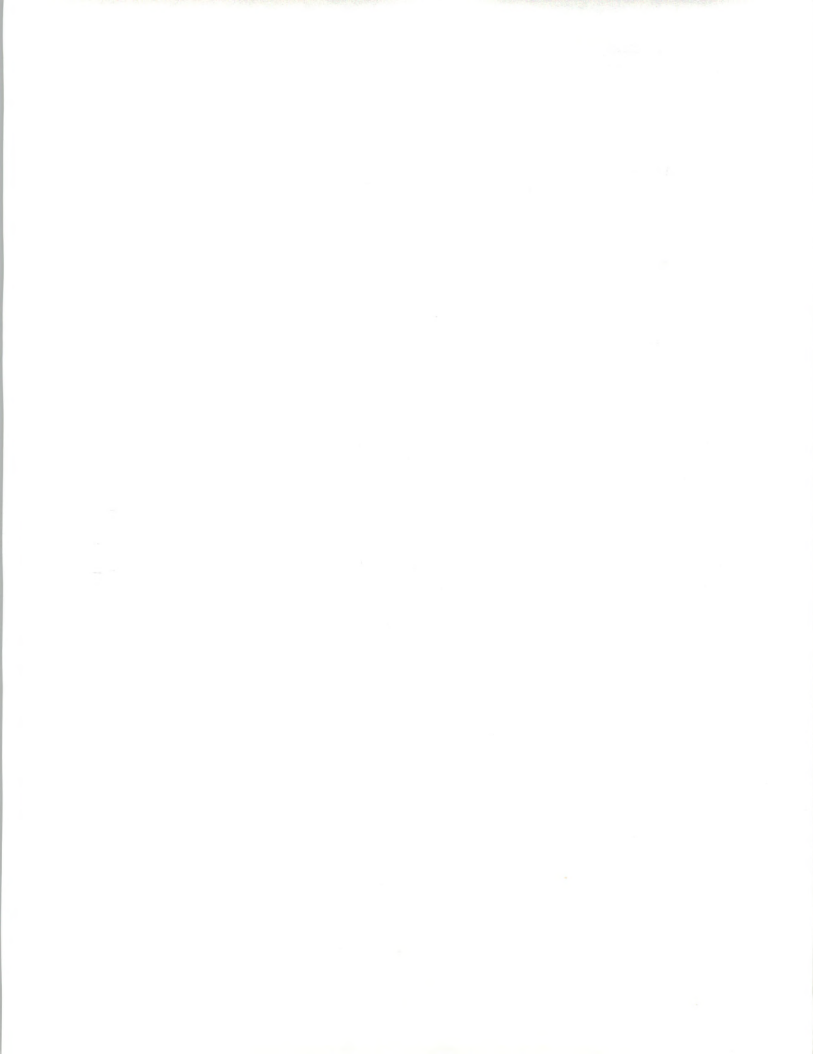


EXHIBIT IV-1

TOP APPLICATION OPPORTUNITIES BY MARKET SECTOR

Market Sectors	Application Categories						
	a. Billing	b. System Design	c. Network Management	d. E-Msg. ¹ , EDI, Data Bases	e. Front-End Gateways	f. Electronic Directories	g. "Sector Unique" ²
1. Rgn. Hld. Cos. (unreg.)	X	-	-	X	X	X	-
2. Bell Oper. Cos. (reg.)	X	-	-	-	-	-	X
3. AT&T as IXC	-	-	-	-	-	-	X
4. Other Large IXCs	-	-	-	-	-	-	X
5. Small IXCs	X	-	-	-	-	-	X
6. Inde. Telcos. (not GTE)	X	-	X	X	X	X	-
7. Value-Add. Net. Svcs.	-	-	-	X	X	-	-
8. Mobile (Cell./Pag./Air.)	X	X	-	-	-	-	-
9. Altern. Operator Svcs.	X	X	X	-	-	-	-
10. Telex	-	-	-	?	-	-	-
11. Satellite Ops./Svcs.	X	-	X	-	-	-	-
12. Cable	X	X ³	-	-	-	-	-
13. International (IRCs)	-	-	-	-	-	-	-
14. PTTs	X	X ⁴	X ⁴	X	X	X	X
15. Private Net. Owners	-	X	X	X	X	-	-
16. Broadcast Networks	-	-	-	-	-	-	-

Notes:

1. E-Msg. = Both text and voice
2. See text for "Market Sector/Opportunity Matrix" for sector specifics
3. Integrated telephone/cable "pay-per-view" systems
4. Including digital cellular for Europe, basic capabilities elsewhere



Overall, INPUT finds few top applications repeated among a number of market sectors. Rather, application opportunities that are unique to a single sector—or perhaps two—are far more common. This should concern GTE as an information services vendor, as it indicates that few applications provided by GTE Information Services would be leveragable across multiple market sectors. As a result, in many instances GTE Information Services will need to evaluate whether overall size of the one or two sectors to be served by a particular application will justify the investment required to compete. Such evaluation may determine that limited cross-sector marketability will make profitable service of that application unfeasible.

Billing as an application may prove an exception to this reservation. On the negative side, INPUT judges as relatively low the needs for billing-application information services for AT&T as an IXC and Other Large IXCs. Positively, however, good billing-application opportunities will be found in other market sectors, applications that share characteristics based on common telephone operations: both the Regional Holding Companies and the Bell Operating Companies (for new-services billing and for the long-overdue reconstruction of generally antiquated billing systems for "standard" telephone service), the Small IXCs (with less-extensive internal resources to handle such applications), Mobile (due to fast-growing cellular telephone businesses that may be outstripping internal resources), Alternative Operator Services (that face new complexities of billing, given both immediate growth from allocation decisions and possible regulatory changes), and PTTs (especially in Europe, as the 1991 introduction of a unified digital cellular telephone and data system inaugurates a new era of complex cross-border billing). In contrast, however, several other good billing-application opportunities will prove relatively unique in form to each of two market sectors: Satellite Operators/Services (for rapid expansion of VSAT operations) and the Cable market sector (especially for new pay-per-view services, in conjunction with telephone-based service ordering). In general, GTE Information Services should note that, while cross-market application leverage among most sectors will be minimal, an information services vendor could build expertise and a reputation as a leading vendor in billing systems in general.

Leverage of "top applications" among the market sectors cited for **System Design** is notably weak. There will be limited—if any—application overlap and leverage among design of: new digital cellular systems for Mobile, network connections or support systems for Alternative Operator Services, new integrated pay-per-view systems for Cable, new digital cellular (in Europe) or other network capabilities (elsewhere) for PTTs, or Private Networks.

Similarly, while **Network Management** tools and/or services will be valued applications to Independent Telephone Companies, Alternative Operator Services, Satellite Operators/Services, PTTs, and Private Network Owners, few factors unite their needs for network management applications. The good news is that the network management needs of the Private Network Owners alone look like a large and fast-growing business.

It will take detailed investigation—and further market evolution—to determine the extent of shared market-sector requirements for **Electronic Messaging** (text and voice), **EDI** (**Electronic Data Interchange**), and **Data Bases** among the market sectors of the Regional Holding Companies, the Independent Telephone Companies, the PTTs, and



Private Network Owners. (Note that the questionable application opportunity to help the Telex market sector integrate their old-line services with modern electronic messaging is clearly a unique application.) While the application needs of the Regional Holding Companies (once free of service-provision constraints) and the Independent Telephone Companies in this matter are similar in many ways, there is also a crucial difference: the limited willingness of most Independents to provide such new services outside their traditional service regions, as opposed to the Regionals' clear willingness (some would say, rush) to provide unregulated services outside their designated regions. The two other sectors cited—PTTs and Private Network Owners—both show top needs to contract with outside information service providers for this complex of capabilities, but their ultimate needs (for provision of such services to their public customers, versus service to in-house departments as "customers") appear so disparate on initial analysis that overlaps—and thus leverage—are hard to find.

In terms of **Front-End Gateways**, little can be said about cross-sector leverage except that this application area remains relatively new and still ill-defined, so that it is too early to predict effective leverage of applications among the market sectors for which this is cited as a top application opportunity. In time, these applications will likely share many characteristics with the Electronic Messaging... applications just discussed, once those are analyzed in more depth.

Electronic Directories stand in sharp contrast to the general lack of leveragability cited for most application categories (the good news), but are seen as a top application for only three market sectors: the Regional Holding Companies, the Independent Telephone Companies, and the PTTs (the bad news). GTE's corporate experience in publishing directories should prove ideally applicable in helping GTE Information Services to "invent" this new service and leverage that skill among all three market sectors.

Finally, the so-called "**Sector-Unique**" applications present a particularly thorny cross-market leverage problem. INPUT notes that these applications generally tend to be fairly specific to the historic conditions of each of these "telephone" businesses (thus the "sector unique" designation), and that they are relatively numerous. Therefore, the likelihood of effective leverage of such applications among market sectors is relatively low. The "exception" would be leverage of selected applications determined by GTE Information Services to be shared among a number of the Bell Operating Companies *within* that market sector, if not across any other sectors.

B

Discussion: Market Quantification and Forecasts

Exhibit IV-2, "Market Quantification and Forecasts" provides INPUT's sector-by-sector estimates and forecasts, including breakdowns (and totals) by delivery mode for 1988, 1988 totals, Compound Annual Growth Rates (CAGRs) for five years, and 1993 totals.



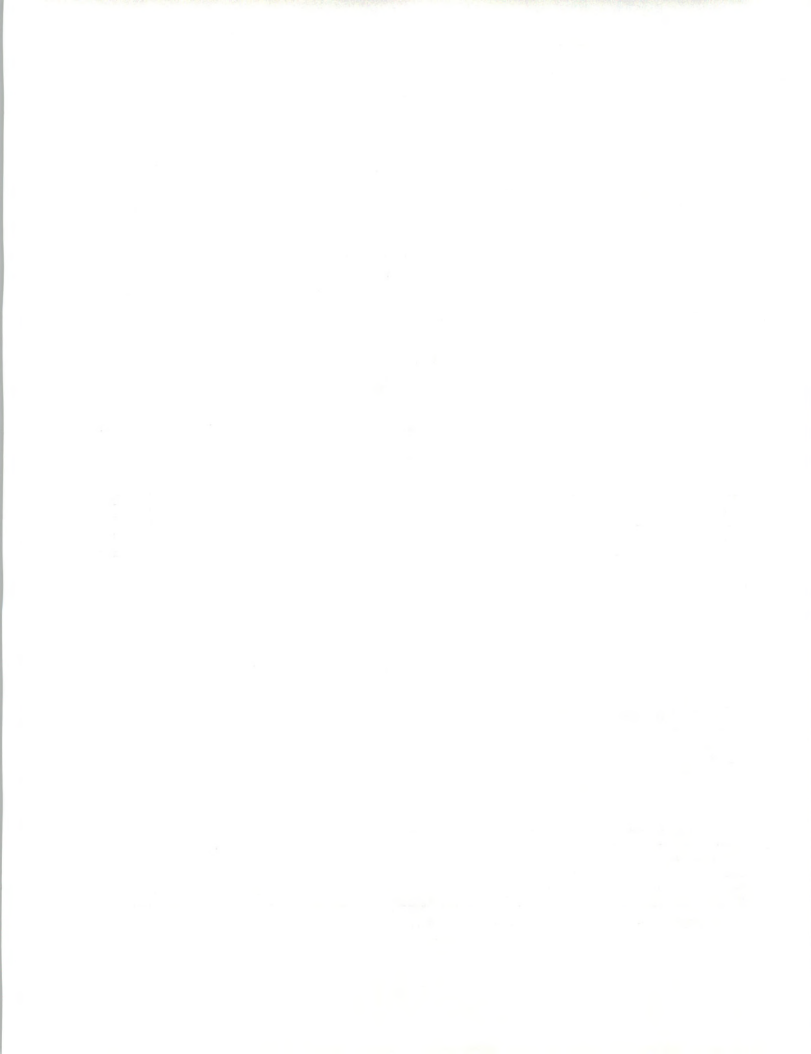
EXHIBIT IV-2

MARKET QUANTIFICATION AND FORECASTS

(\$ millions, except CAGR percentages)

Market Sectors	Delivery Modes						Market Quantification		
	Processing Services	Professional Services	Packaged Software	Turnkey Systems	Systems Integration	Network Services	1988 Total	5-Year CAGR	1993 Total
1. Rgn. Hld. Cos. (unreg.)	30	70	10	10	20	10	150	23%	430
2. Bell Oper. Cos. (reg.)	340	300	90	210	50	10	1,000	13%	1,860
3. AT&T as IXC	40	90	10	-	30	10	180	16%	370
4. Other Large IXCs	50	20	-	-	10	-	80	26%	250
5. Small IXCs	-	-	10	-	-	-	10	15%	20
6. Inde. Telcos. (not GTE)	60	90	20	10	10	10	200	13%	370
7. Value-Add. Net. Svcs.	-	10	-	-	-	-	10	32%	40
8. Mobile (Cell./Pag./Air.)	40	100	10	40	10	-	200	34%	860
9. Altern. Operator Svcs.	20	10	-	-	-	-	30	0%	30
10. Telex	10	-	-	-	-	-	10	0%	10
11. Satellite Ops./Svcs.	-	10	-	-	-	-	10	25%	30
12. Cable	30	50	10	-	10	-	100	15%	200
13. International (IRCs)	-	-	-	-	-	-	-	-	-
14. PTTs	370	420	80	200	100	30	1,200	17%	2,630
15. Private Net. Owners	-	120	150	180	130	-	580	18%	1,330
16. Broadcast Networks	-	-	-	-	-	-	-	-	-
TOTALS	990	1,290	390	650	370	70	3,760	18%	8,430

Notes: CAGR = Compound Annual Growth Rate; Rounding may affect totals



For the **Regional Holding Companies**, the concentration of the quantified market in the delivery mode of Professional Services indicates INPUT's judgment that their primary information services requirement is for customized consulting and application development to meet case-by-case needs as they enter new unregulated businesses. The relatively fast growth in information services forecast from 1988 to 1993 results from continual widening of their scope of business in the growing (and merging) business of computers/communications.

Bell Operating Companies show a broader distribution, primarily among the delivery modes of Processing Services, Professional Services, and Turnkey Software. Monthly billing to wide customer bases and other periodic overload requirements underlie the Processing Services category. Professional Services are used to help develop system refinements and innovations. The sizable Turnkey delivery mode relates mainly to the sale of packaged voice messaging systems to the Bell Operating Companies, as well as packaging of refined or innovative systems for resale to the other Bells. Slower growth in information services is forecast for this more traditional market sector.

AT&T as IXC primarily needs Professional Services, once again for system refinements and innovations to support their on-going long-distance and networking business. Again, information services growth is slower than for the Regional Holding Companies' unregulated operations, although somewhat faster than for the Bell Operating Companies.

Other Large IXCs exhibit needs primarily for Processing Services related to their growing client bases of long-distance customers, work that their rate of business growth often drives to outside suppliers. Relatively fast growth in information services required is predicted as they continue to win market share away from AT&T in a growing market.

Small IXCs' information services volume nearly disappears at the level of estimate rounding used here. They use Packaged Software that derives from systems developed for the larger IXCs, and will grow slowly in information services needs.

Independent Telephone Companies show their primary needs in Professional Services, for the same reasons cited earlier, with a secondary need for outside Processing Services to meet periodic overload needs. Their information services needs are not growing fast, on the forecast that they will stay primarily (in most cases) in more-traditional telecommunications services.

Value-Added Network Services show negligible—though faster-growing—needs for Professional Services to support continued technical evolution and migration toward more content-oriented services like EDI. EDI-related growth is a major contributor to the information services growth rate shown here, from a very small base.

The **Mobile** sector primarily needs Professional Services, both to support ongoing growth and to design and implement the next generation of digital cellular systems. Although it cannot be shown on this exhibit, INPUT forecasts a relative shift from Professional Services into Packaged Software by 1993, as custom-built solutions are repackaged for multiple sales opportunities within the sector. The digital cellular need underlies the aggressive forecast for information services growth.



Alternative Operator Services do use some Processing Services for periodic requirements, but are judged by INPUT to rise only short term in their business and information services needs, then to fall back under re-regulatory and competitive pressures, for a net growth rate of 0%.

Telex uses some periodic Processing Services, but is on the decline as an industry and will not grow in information services.

Satellite Operators/Services need consulting Professional Services from time to time today, and will grow significantly in this need as next-generation VSAT technology increases the complexity of their information services needs.

The picture for **Cable** resembles that for Satellite in the need for Professional Services, plus some telephone-like needs for periodic Processing Services to handle a wide base of customers. As with Mobile, slower Professional Services growth will be complemented by faster Packaged Software Growth from remarketing of custom-built solutions. Growth of the industry and its information services needs overall is forecast as only moderate.

As detailed earlier, **International (IRCs)** is simply not a relevant market sector.

PTTs offer excellent information service market opportunities in both Professional Services (for consulting and software development assistance) and Processing Services (for periodic needs), with lesser but sizable needs for Turnkey Systems that vendors develop once and then sell industrywide, particularly for the new technology of voice messaging. With a strong internal infrastructure for handling information services, however, their market growth for externally provided services is only moderate.

Private Network Owners buy information services relatively evenly among four delivery modes: Professional Services (for network design and development), Packaged Software (for standard network-control functions), Turnkey Systems (such as packages to control/switch the network's T-1 circuits or packets), and Systems Integration (to tie together complete new or upgraded systems). Their information-services growth is moderate, as an established yet still growing industry.

As discussed earlier, **Broadcast Networks** are not a factor in the information services opportunities available to GTE Information Services.



V. Recommendations

INPUT recommends to GTE Information Services the following action items, in priority order:

1. Concentrate market-planning initially on the three market sectors identified as "Attractive" for factor "f. Overall Market Opportunity" in "Exhibit III-1, Market Sector/Opportunity Matrix":

- Regional Holding Companies (unregulated operations)
- Mobile (especially cellular telephone)
- Private Network Owners

In the process, determine whether GTE Information Services will be primarily a broad-based solutions provider to these sectors, or mainly a product specialist (for example, for billing systems and network management systems).

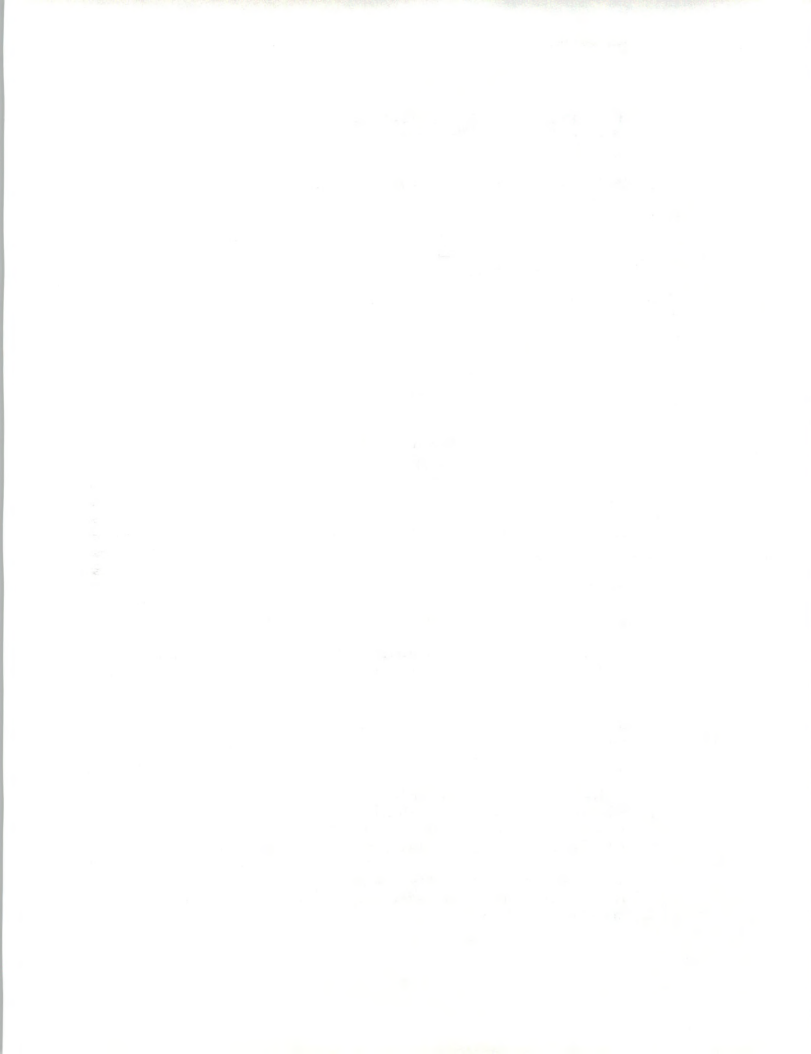
2. Review in detail the findings on specific market-opportunity factors for the Independent Telephone Companies (excepting GTE) market sector, to determine if this should be classed for internal market-planning purposes with the three attractive market sectors just identified. Factors to consider include:

- a. Experience to-date with intra-corporate information services provided to GTE independent telephone operations.
- b. Future internal-service and charge-back/payment policies at GTE's corporate level.
- c. Evaluation of the "double-edged sword" cited for position 6.G. in the matrix: Although GTE as a corporation in general (and perhaps as its Information Services division in particular) is clearly an experienced leader in this market sector, will GTE nonetheless be perceived primarily as a competitor and thus an unacceptable information services vendor to other Independent Telephone Companies?

3. Considering all four of these market sectors together, base market-planning investment priorities in part on their anticipated 1993 market for information services, which rank as follows:

- \$1.3 billion for Private Network Owners
- \$860 million for Mobile (primarily cellular)
- \$430 million for the Regional Holding Companies
- \$370 million for (non-GTE) Independent Telephone Companies

4. In terms of primary application-opportunity categories cited in "Exhibit IV-1, Top Application Opportunities by Market Sector," evaluate applications among these four market sectors as follows:



- a. **Billing opportunities**—both so-called standard billing and "enhanced" billing needs created by new technical and competitive options—should share at least some characteristics among two of the three "telephone" sectors: Independent Telephone Companies, and Mobile (primarily cellular telephone). This should enhance their leveragability—and thus their profit potential to GTE—especially since GTE's own telephone experience no doubt provides ready-made application solutions for these markets.
- b. **System Design** application opportunities referenced for Mobile (primarily cellular) and Private Network Owners will not be leveragable between the market sectors, as one refers primarily to the design of the digital-cellular network systems while the other denotes the design of multi-function, integrated-long-distance-and-local voice and data networks (based on T-1 and other non-cellular technologies).
- c. Both Independent Telephone Companies and Private Network Owners will be in the market for **Network Management** tools (although *not* for subcontracted operation of such networks, which they consider a vital competitive asset). INPUT judges that these markets will be available primarily to vendors who first sell these organizations the up-front application of network system design services.
- d. Further evaluation will be required to determine the extent of overlapping or shared application opportunities for **Electronic Messaging (text and voice)**, **EDI (Electronic Data Interchange)**, and **Data Bases** among the market sectors of the Regional Holding Companies, the Independent Telephone Companies, and Private Network Owners. INPUT forecasts that continued regulatory uncertainties as to permission for the Regional Holding Companies to provide these services will be lifted (by the Federal Court, the FCC, and/or Congress) by the early 1990s—generally in favor of the Regional Holding Companies. At that time this application opportunity will grow quickly. Although the unregulated portions of the Independent Telephone Companies are free to offer such services now, most have done relatively little to date (with the exception of Telemail from GTE/United Telecommunication's US Sprint venture), and are generally expected to keep their emphasis in more-traditional telecommunications. The needs of Private Network Owners for Electronic Messaging, EDI, and Data Base applications are to replicate in their private network environments these capabilities—more traditionally purchased from network services providers. Technically their applications needs in this category should be similar to those for the other sectors, the primary difference being just the network for transmission, not the services provided.
- e. Parallel evaluation should be made of these market sectors' needs for the still ill-defined category of **Front-End Gateway** services. This evaluation should pay special attention to new forms of user-friendly gateway-based access to wide-ranging outside data bases, gateways that can be designed to overcome both usage obstacles inherent in service-specific access procedures and cross-billing challenges.
- f. Both the Regional Holding Companies (when and to the extent permitted) and the Independent Telephone Companies are ideally positioned to leverage sizable current business activities—printing paper-based "yellow pages" directories—into new



businesses of providing **Electronic Directories**. INPUT recommends special attention to this application opportunity in these market sectors for three reasons: First, both market sectors have the "raw material" for such service—in the form of electronic data bases of directory information used for electronically typesetting the paper-based directories. Second, this new market will be in part a classic "technology push" opportunity, where the technical information-services-based ability to "translate" this data base into useful services will be necessary before the new business opportunity can be realized. Third, if appropriate experience in paper directories of GTE Directory Services can be made available to GTE Information Services, the latter should be able to offer either market sector important non-technical value-added services: business-planning assistance in defining useful new electronic-directory services that customers will indeed purchase. Special attention should go to business-oriented services (in contrast to home-oriented "electronic yellow pages"), perhaps with targeting toward purchasing departments and in conjunction with the EDI services discussed above. Fourth, and most important, the Regional Holding Companies market sector should be willing to invest heavily now in planning for such attractive new business opportunities, in anticipation of eventual federal permission to provide electronic directories.

5. As a secondary priority, reevaluate the market sectors identified in the matrix as "Moderate" for factor "F. Overall Market Opportunity" in "Exhibit III-1, Market Sector/Opportunity Matrix":

- AT&T as IXC
- Other Large IXCs
- Alternate Operator Services
- Satellite Operators/Services
- Cable
- PTTs

to determine if particular experience to date by GTE Information Services (of which INPUT was not apprised for this project) in serving one or more of these sectors—or other factors, such as GTE corporate strategic priorities—indicates elevating them to "attractive" status for market planning purposes. Note that ranking these "moderate" opportunities by their anticipated 1993 markets for information services gives them the following priorities as to forecast market size:

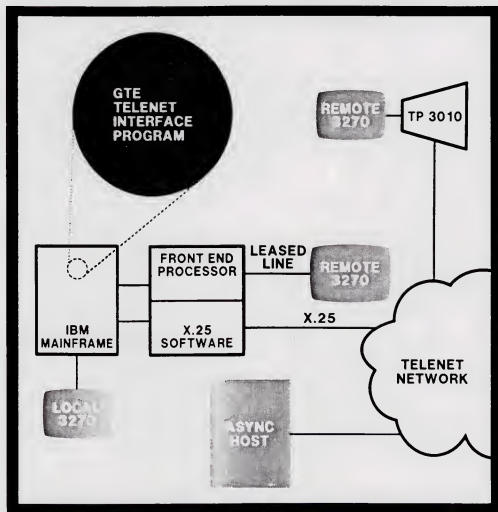
- \$2.6 billion for PTTs
- \$370 million for AT&T as IXC
- \$250 million for Other Large IXCs
- \$200 million for Cable
- \$30 million for Alternate Operator Services
- \$30 million for Satellite Operators/Services



EXTRA
LOGO



The GTIP Software Solution

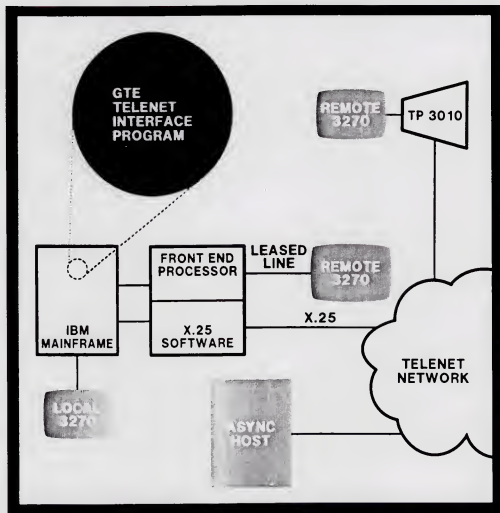


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